

Appl. No. : 10/628,614 Confirmation No. 4439  
Applicant : Roger Y. B. Young, et al.  
Filed : July 28, 2003  
TC/A.U. : 2878  
Examiner : Le, Que Tan  
Title : Wafer Edge Defect Inspection Using Captured Image  
Analysis (as amended)  
  
Docket No. : 03-0460  
Customer No. : 024319

Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

**Second Amended Appeal Brief**

Sir:

In response to the **Notification of Non-Compliant Appeal Brief** of August 8, 2007, and to a telephone conference August 6, 2008:

**An Amended Summary of claimed subject matter** begins on page 2 of this paper.

**Remarks** begin on page 6 of this paper.

Appl. No. 10/628,614  
Date: August 6, 2008  
Amended Appeal Brief

**Amended Summary of claimed subject matter**

Independent claim 2 includes a method of inspecting a semiconductor wafer 136 for defects 172-184 using captured image analysis comprising: positioning the wafer 136 with an edge thereof relative to a scanning electron microscope 132, 134 (page 10, line 24 to page 11, line 11); rotating the wafer 136 (page 10, lines 19-21); scanning the edge of the rotating wafer 136 with the scanning electron microscope 132, 134 (page 10, lines 19-21); recording an image of the scanned wafer 136 from the scanning electron microscope 132, 134 into a database 126 (page 8, lines 19-20; page 11, lines 21-23); instructing a computer 128 to analyze the recorded images of the scanned wafer 136 (page 8, lines 27-29); identifying any defects in the analyzed recorded images (page 8, lines 29-30); and upon identifying any defects, recording defect information related to each defect (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2).

Independent claim 4 includes a method of inspecting a semiconductor wafer 136 for defects 172-184 using captured image analysis comprising: positioning the wafer 136 with an edge thereof relative to an image capturing device 132, 134 (page 10, line 24 to page 11, line 11); positioning the image capturing device 132, 134 at a desired angle relative to the edge of the wafer 136 (page 12, lines 1-4); rotating the wafer 136 (page 10, lines 19-21); scanning the edge of the rotating wafer 136 with the image capturing device 132, 134 (page 10, lines 19-21); recording an image of a desired portion of the edge of the scanned wafer 136 from the image capturing device 132, 134 into a database 126 (page 8, lines 19-20; page 11, lines 21-23); instructing a computer 128 to analyze the recorded images of the scanned wafer 136 (page 8, lines 27-29); identifying any defects in the analyzed recorded images (page 8, lines 29-30); and upon identifying any defects, recording defect information related to each defect (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2).

Appl. No. 10/628,614  
Date: August 6, 2008  
Amended Appeal Brief

Independent claim 6 includes a method of inspecting a semiconductor wafer 136 for defects 172-184 using captured image analysis comprising: after a first process step (e.g. at 104): positioning the wafer 136 with an edge thereof relative to an image capturing device 132, 134 (page 10, line 24 to page 11, line 11); rotating the wafer 136 (page 10, lines 19-21); scanning the edge of the rotating wafer 136 with the image capturing device 132, 134 (page 10, lines 19-21); recording an image of the scanned wafer 136 from the image capturing device 132, 134 into a database 126 (page 8, lines 19-20; page 11, lines 21-23); instructing a computer 128 to analyze the recorded images of the scanned wafer 136 (page 8, lines 27-29); identifying any defects in the analyzed recorded images (page 8, lines 29-30); and upon identifying any defects, recording defect information related to each defect (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2). after a second process step (e.g. at 106), repeating the aforementioned steps (page 5, line 27 to page 6, line 13); comparing the defect information recorded after the first process step to the defect information recorded after the second process step (page 5, line 27 to page 6, line 13); and identifying any new defects as added defects due to the second process step (page 6, line 5; page 12, line 26 to page 13, line 10).

Independent claim 7 includes a method of inspecting a semiconductor wafer 136 for defects using captured image analysis comprising: after a first process step (e.g. at 104): positioning the wafer 136 with an edge thereof relative to an image capturing device 132, 134 (page 10, line 24 to page 11, line 11); rotating the wafer 136 (page 10, lines 19-21); scanning the edge of the rotating wafer 136 with the image capturing device 132, 134 (page 10, lines 19-21); recording an image of the scanned wafer 136 from the image capturing device 132, 134 into a database 126 (page 8, lines 19-20; page 11, lines 21-23); instructing a computer 128 to analyze the recorded images of the scanned wafer 136 (page 8, lines 27-29); identifying any defects in the analyzed recorded images (page 8, lines 29-30); and upon identifying any defects, recording defect information related to each defect (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2). after a second process step

Appl. No. 10/628,614  
Date: August 6, 2008  
Amended Appeal Brief

(e.g. at 106), repeating the aforementioned steps (page 5, line 27 to page 6, line 13); comparing the defect information recorded after the first process step to the defect information recorded after the second process step (page 5, line 27 to page 6, line 13); determining whether any defects identified after the first process step have been reduced after the second process step (page 6, line 6; page 9, lines 2-3 and 27-29; page 13, lines 11-14); and identifying any such reduced defects as repaired defects (page 6, line 6; page 9, lines 2-3 and 27-29; page 13, lines 11-14).

Independent claim 10 includes a method of inspecting an edge of a semiconductor wafer 136 for defects during fabrication of integrated circuit components on the semiconductor wafer 136 within a fabrication system 100 that includes a plurality of fabrication stations 102-114 arranged in a processing order and within which a variety of process steps are performed on a plurality of wafers 136 (page 5, lines 4-10), comprising: providing a plurality of inspection stations 116-122 within the fabrication system 100 corresponding to selected ones of the fabrication stations 102-114, each inspection station 116-122 being located in a subsequent processing order to a corresponding one of the selected fabrication stations 102-114 (page 5, line 10 to page 6, line 13); processing a wafer 136 in a first fabrication station (e.g. 104) (page 5, lines 11-18); automatically inspecting an edge of the wafer 136 in a first inspection station (e.g. 116) (page 12, line 26 to page 13, line 14); automatically recording a first set of defects in the edge of the wafer 136 (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2); processing the wafer 136 in a second fabrication station (e.g. 106) (page 5, lines 11-18); automatically inspecting the edge of the wafer 136 in a second inspection station (e.g. 118) (page 12, line 26 to page 13, line 14); and automatically recording a second set of defects in the edge of the wafer 136 (page 9, line 16 to page 10, line 2; page 12, line 26 to page 13, line 2).

Independent claim 13 includes a method of inspecting an edge of semiconductor wafers 136 for defects during fabrication of integrated circuit components on the semiconductor wafers 136 within a fabrication system 100 that

Appl. No. 10/628,614  
Date: August 6, 2008  
Amended Appeal Brief

includes a plurality of fabrication stations 102-114 arranged in a processing order and within which a variety of process steps are performed on a plurality of wafers 136 (page 5, lines 4-10), comprising: providing a plurality of inspection stations 116-122 within the fabrication system 100 corresponding to selected ones of the fabrication stations 102-114, each inspection station 116-122 being located in a subsequent processing order to a corresponding one of the selected fabrication stations 102-114 (page 5, line 10 to page 6, line 13); processing the wafers 136 in the fabrication stations 102-114 (page 5, lines 11-18); inspecting the edge of the wafers 136 in the inspection stations 116-122 (page 12, line 26 to page 13, line 14); upon inspecting each wafer 136, recording an image of the edge of the wafer 136 (page 8, lines 19-20; page 11, lines 21-23); and correlating each recorded image with the wafer 136 from which it was taken and the process step after which it was taken (page 8, lines 20-25).

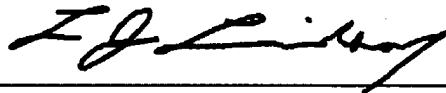
Independent claim 16 includes a wafer edge defect inspection system 116-122 comprising an image capturing device 132, 134, a database 126 and a computer 128 (page 8, lines 4-6). A wafer 136 can be positioned next to the image capturing device 132, 134 (page 10, line 24 to page 11, line 11). The image capturing device 132, 134 is oriented to view at least a portion of an edge of the wafer 136 (page 12, lines 1-4). The image capturing device 132, 134 automatically generates an image of the edge of the wafer 136 (page 10, lines 19-21). The database 126 is connected to the image capturing device 132, 134 to receive the generated image of the edge of the wafer 136 (page 8, lines 4-20). The database 126 automatically stores the received image for subsequent analysis (page 9, lines 5-15). The computer 128 is connected to the database 126 to retrieve the stored image upon instruction from a user to perform image analysis to locate any defects in the edge of the wafer 136 (page 8, line 27 to page 9, line 8).

Appl. No. 10/628,614  
Date: August 6, 2008  
Amended Appeal Brief

**Remarks**

Applicant respectfully submits that the above **Second Amended Summary of claimed subject matter** cures the defect in the Appeal Brief filed on 11 April 2006.

Respectfully submitted,



August 6, 2008  
Date

L. Jon Lindsay  
Registration No. 36,855  
ATTORNEY FOR APPLICANT

L. Jon Lindsay  
342 Litchfield Ln.  
Houston, TX 77024  
Telephone: 713-984-2398  
Facsimile: 928-563-4114